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Superconducting and magnetic properties of epitaxial high-quality Fe/Nb bilayers

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Abstract

Single crystal Fe/Nb (110) bilayers with an Nb thickness d Nb in the range from 140 to 650 Å and with an Fe thickness d Fe in the range from 5 to 100 Å were prepared using molecular beam epitaxy (MBE) techniques. For d Fe≥20 Å a decrease of the superconducting transition temperature T c with decreasing d Nb was observed. For d Fe=20 Å the FMR data revealed a decrease of the effective magnetization of the Fe layer below the superconducting transition. This magnetization behavior is attributed to a spatial modulation of ferromagnetic order due to a modification of the RKKY interaction in the superconducting state. © 1997 American Institute of Physics.